FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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EDITORIAL COMMENT.

British Aircraft Progress.

While the Under-Secretary for War's eulogium of our Flying Services in the House of Commons on Monday conveys, perhaps, nothing new to those in close touch with the aviation movement, it is to be welcomed as bringing into prominence once again with the general public the all-vital work that is being done by our aircraft, and the great progress that has been made in aircraft design and construction in this "decadent" country of ours.

Incidentally, too, Mr. Tennant's remarks should give a fillip to the subscription list of the Flying Services' Fund organised by the Royal Aero Club, latest particulars of which appear under the Club's official notices in this issue.

The Under-Secretary's remarks, though brief, covered practically the whole field; they testified to the superiority of our flying officers, and to the excellence of our machines. He also drew attention to the fact that we are rapidly becoming, if indeed we have not already become, self-supporting, in the matter of aeronautical output, he laying special emphasis on the fact that British-made engines are now beginning to play their part in the aerial operations at the front.

That the British-built aviation engine would come into its own, in like manner to the British-built motor car engine in the past, was a certainty, and although it has been delayed in its career, for reasons which we will not at the present moment elaborate, it is none the less a matter for congratulation that it has at last received the official recognition for which it has so long fought.

As we have said again and again, the British Flying Services have, since the war began, more than proved their efficiency, having shown themselves capable of carrying out all the varying classes of work entrusted to them. There would, however, appear to be some writers who seem to imagine that the use of our aircraft and the capabilities of our flying officers are only put forward in the present struggle upon rare and isolated occasions, and that during the past year or more those entrusted with the control of the Royal Naval Air Service and the Royal Flying Corps have been practically idle, and have failed to study the possibilities, as well as the limitations, of aircraft in the prosecution of war. Thus, the suggestion has been made that we are not allowing our aerial force to serve the country in the hour of need, and that the Allies could deliver a staggering blow to the enemy from the air if they had the moral courage to assure a powerful aerial offensive on a comprehensive and sustained scale!

It is the old experience of the looker-on criticising and giving advice to those actually participating in the work, as to the methods they should adopt to ensure success, entirely ignoring the probability of those who have to shoulder the heavy responsibility of seeing to the efficiency of their section of the Army, having carefully worked out, under the Commander-in-Chief, plans for meeting practically every eventuality.

In the case in point we have not the slightest doubt that a grand scheme has long since been carefully elaborated, and, if it has not yet been put into practice, it is because those in the best position to judge consider the hour is not yet. There was a time when our naval and military aircraft equipment was subjected to considerable criticism, but the records of unprecedented progress achieved by both branches of the Flying Services since they had a freer hand and more generous treatment from the Government have not only won the commendation of all, but have established a conviction that our fourth arm can be relied upon to do whatever is asked of it, and that at the time demanded.

To those who would from home direct the operations at the front we would most respectfully suggest that they may with confidence "wait and see" what "The Day" brings forth, when the psychological moment arrives.

* * *

The Enemy's "Paper" Blockade.

Even before the fateful date of February 18th has arrived, the Huns are beginning to realise that in proclaiming a blockade of the United Kingdom they have taken on a little job which is likely to re-act on them in no uncertain manner. With its Navy still in hiding, this fool blockade is only likely to have the result of providing Germany with further enemies rather than bringing friends from among the neutral countries, and in the meantime, as the *Matin* states, "Great Britain says nothing. She is going to act before even knowing whether the German submarines are capable of doing a quarter of what is expected from them. She determines to bring her effectives up to the number of three million men."

It is possible, of course, that the enemy will attempt something to endeavour to justify his proclamation, but with his warships afraid to venture out he makes no pretence at any real blockade other than the mischief which his few submarines may bring about in a hole-and-corner way, during which time they will be tracked down one by one until even this form of international outrage has to cease. And, in securing this end, our aircraft fleet should be able to render invaluable assistance. By concerted action, it can maintain an aerial patrol over the whole of the sea area in which the range of the enemy's submarines will permit them to travel. The construction of submarines has undoubtedly made great progress, but when seeking their prey they would be generally visible from an aeroplane, the pilot of which, by means of wireless telegraphy or signals, can give the necessary information to destroyers acting in conjunction with them.

Our naval authorities have been noticeably reticent as to what they are doing to meet the enemy's threatened blockade, but the fact that nothing has been said is no indication that nothing is being done, and, whether it is by means of aerial patrols, to which we have alluded, or in some other way, we have not the slightest doubt that the threatened blockade will practically be equivalent to another "scrap of paper."

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The Flying Services Fund.

FROM the Official Notices of the Royal Aero Club on page 110 it will be seen that there has been a good sum added to the Fund during the past week, including £100 from Messrs. Wm. Harland and Son, and £50 from Mr. James E. Withers. What is even more encouraging is to notice the large number of small amounts which have been sent in, and we would once again impress upon our readers that every contribution, however small, will be as welcome as the greatest. If the Fund is to fulfil its purpose and achieve the success which it deserves, it is essential that one and all should do what they can to help to swell the total, and those who cannot do much should remember the old Scotch proverb, "Every mickle mak's a muckle."

Subscriptions should be forwarded to The Flying Services Fund, The Royal Aero Club, 166, Piccadilly, London, W., or to Barclay and Co., Ltd., 1, Pall Mall East, London, S.W. Cheques should be crossed "Barclay and Co., Ltd."

A War Office "Industrial Army" Medal.

It is with regret that we find the War Office has not yet seen its way to follow the example set by the Admiralty in issuing an official "On War Service" badge which can be worn by workmen employed in the Government arsenals and in the works of private concerns engaged on the production of war material.

Although it is now being more generally understood that a fighting army abroad would be absolutely useless without a large industrial army at home to keep up a steady flow of supplies of all kinds, yet we still hear of cases in some parts of the country of these valuable men being taunted by ignorant people for not having joined the colours. It was stated in Parliament on Monday by the Under-Secretary for War that many men had joined the colours without the permission of their employers, and although we are unaware of any law or regulation which requires such permission to be obtained before enlistment, Mr. Tennant stated that in the case of the armament firms some of the men have already, on the instructions of Lord Kitchener, been brought back from France or Flanders to assist in keeping the works going at full strength.

The need and value of such men being thus again emphasised by the War Office, we cannot understand why the military authorities should hesitate to issue immediately the industrial army badge we have so strenuously advocated for several months—an idea which has been adopted by the Admiralty and the Royal Aircraft Factory. It is true that the Under-Secretary for War on Monday announced that Lord Kitchener is considering the possibility of issuing *at the termination of the war* a medal to certain technical workers in the armament firms who have served so faithfully, and by whose skill and zeal the armies are being supplied. No doubt the recipients of such medals will accept, and proudly wear, them as a record of what they *did* during the war. We strongly urge, however, that the badge or medal be issued at once, always subject to its being safeguarded in every respect from abuse, so that it may serve as a visual indication to the public of what the wearers are doing *now* to uphold the honour and existence of the old country, The principle of issuing a medal once adopted, it can make little or no difference to the Government whether it is issued now or at the end of the war, but the difference is a vast one to the members of the Industrial Army.

⊛ ⊛

How to Know Enemy Aircraft.

ON the opposite page is a reproduction of the poster which has been officially approved by the Admiralty and War Office, and is being issued by the Home Office with a view to educating the general public so that they may be able to distinguish friendly from hostile aircraft.

The poster, which is printed in red and black, has been designed and produced by Messrs. Sir Joseph Causton and Sons, Ltd., Eastcheap, London, E.C., who retain the copyright. It is printed under the authority of H.M. Stationery Office, and anyone can obtain a copy either from any bookseller or through the official sale agents, price *2d.*

It is a pity that an obsolete type of Schütte-Lanz airship should have been selected for illustration and the "M" type omitted, but doubtless this will be put right in future editions. The appearance of the poster on the hoardings has created a tremendous amount of interest, and wherever one is put up it is certain to draw a large crowd.

PUBLIC WARNING

The public are advised to familiarise themselves with the appearance of British and German Airships and Aeroplanes, so that they may not be alarmed by British aircraft, and may take shelter if German aircraft appear. **Should hostile aircraft be seen,** take shelter **immediately** in the nearest available house, preferably in the basement, and remain there until the aircraft have left the vicinity: do not stand about in crowds **and do not touch unexploded bombs.**

In the event of **HOSTILE** aircraft being seen in country districts, the nearest Naval, Military or Police Authorities should, if possible, be advised immediately by Telephone of the TIME OF APPEARANCE, the DIRECTION OF FLIGHT, **and whether the aircraft is an Airship or an Aeroplane.**

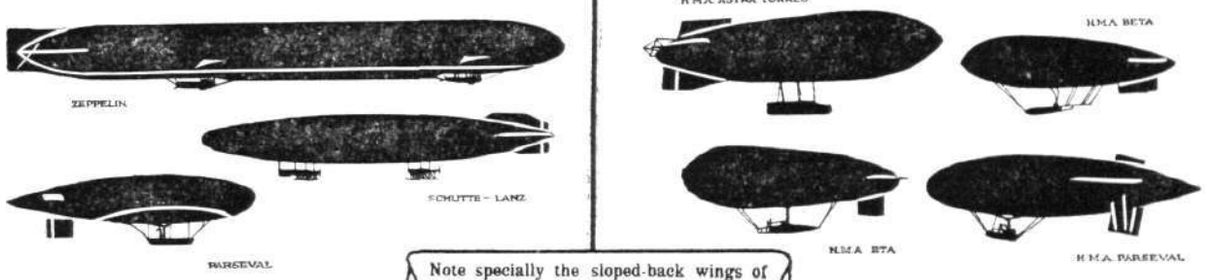
GERMAN

BRITISH

AIRSHIPS

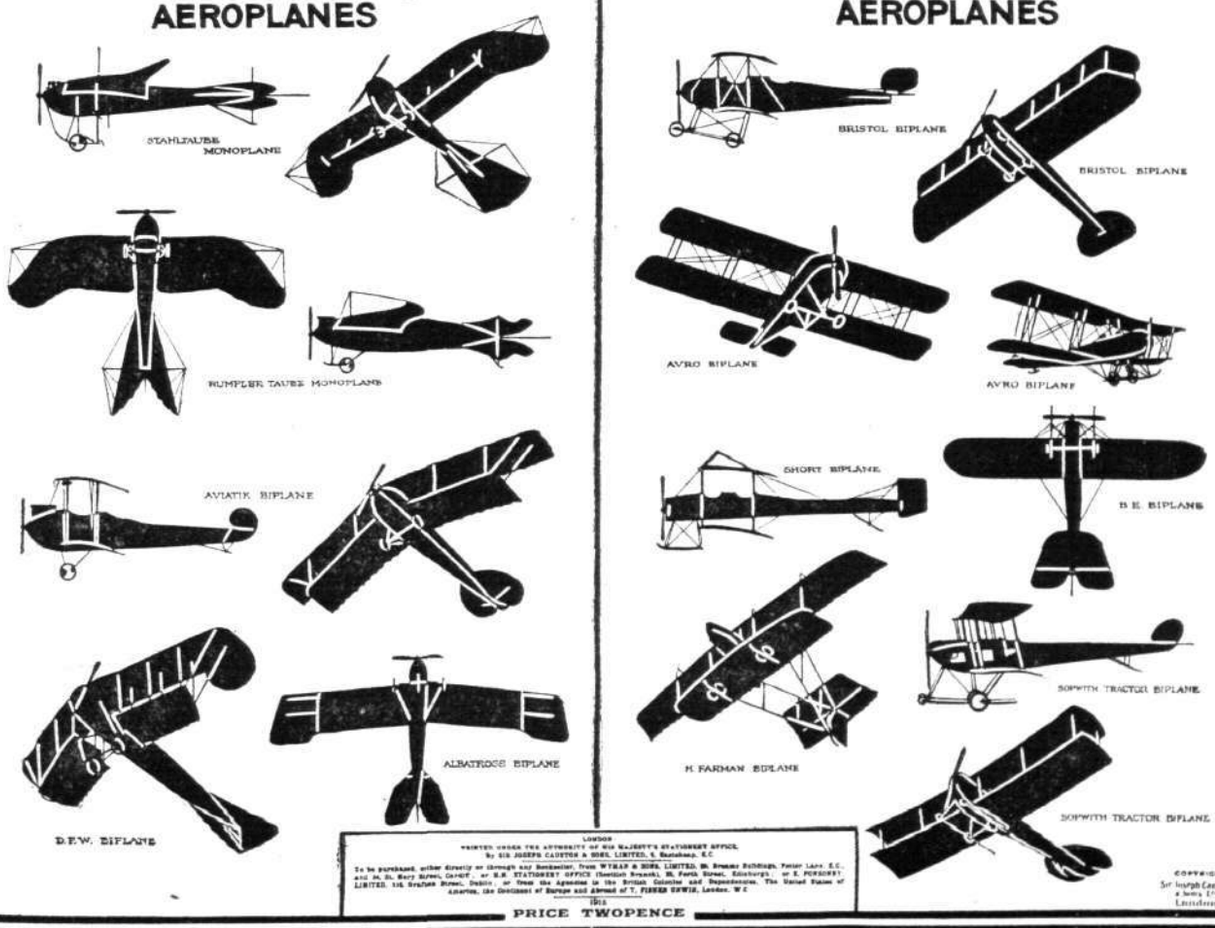
Note specially the shape of the Airships and the position of the passenger cars

AIRSHIPS



Note specially the sloped-back wings of the German Aeroplanes

AEROPLANES



AEROPLANES

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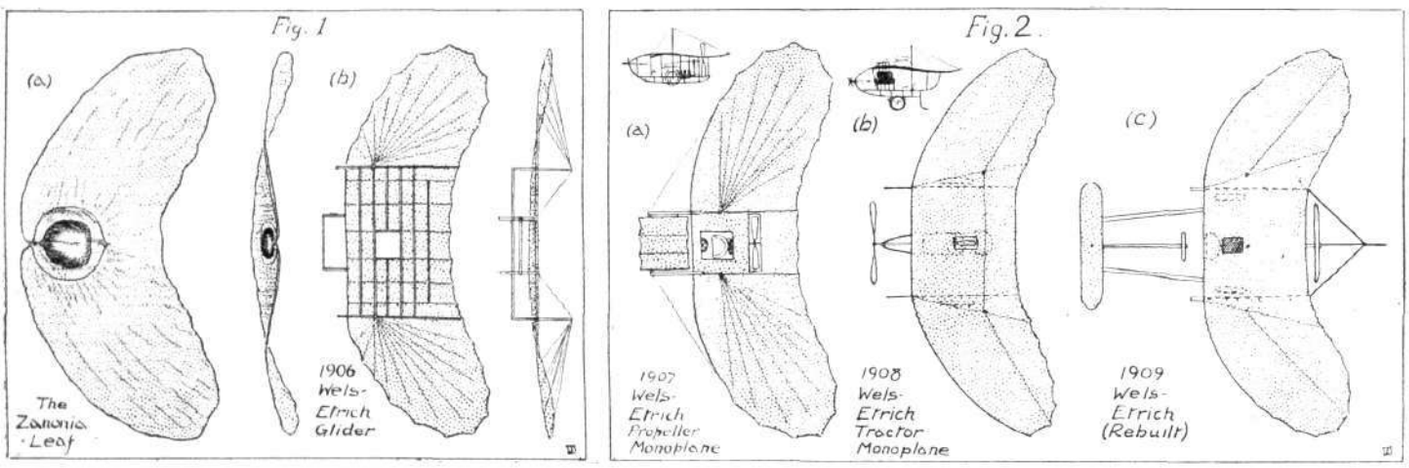
1915.

PRICE TWOPENCE

THE EVOLUTION OF THE ETRICH "TAUBE."

THE evolution of the Etrich "Taube" monoplane, a type upon which so many different makes of German machines are based, is not only of special interest just now on account of the prominence of the "Taube" in the daily events of the present war, but is in itself a particularly interesting subject from the historical point of view. "Taube," as, no doubt, most readers know, is simply the German for dove, and, as will be seen later, the different types of Etrich machines are designated by the names of various birds, owing to the fact that the planes are wing-shaped. As a matter of fact, this design does not derive its origin from the bird, but from the seed-leaf of the Zanonia palm, which possesses remarkable gliding properties when dried. From the sketch of this leaf (*a*), Fig. 1, it will be seen that the seed-pod has been provided by Nature with a perfect gliding mechanism in the shape of a crescent-shaped leaf. When the leaf dries the extremities curl both laterally and longitudinally, with the result that when the seed is ripe and falls from the tree, it makes a long stable glide to the ground. This fact was noted in a brochure written by Prof. Ahlborn, and it was this which first attracted the attention of Herr Igo Etrich, an Austrian, whose father, Herr Iganz Etrich, had started in 1898 to carry on the work of Otto Lilienthal, having bought the original gliders of that pioneer. A thorough study of the Zanonia leaf proved to be no easy matter owing to the difficulty first of obtaining specimens and then of observing the curves assumed by the leaf when gliding. However, a number of paper models were made, and the results obtained convinced Herr Etrich that in a machine constructed on these lines would be found the solution of the problem of making a flying machine automatically stable.

In conjunction with Franz Wels, he set to work, and a large glider, 12 m. span and weighing 20 kg., was built in 1904, the framework being bamboo. With a load of 25 kg., several hundred very successful glides were made, the apparatus showing a marked degree of stability. The success of these experiments induced Etrich and Wels to go a step further and endeavour to obtain prolonged horizontal flights. To this end they constructed another model, to which they fitted a 3½ h.p. Laurin and Klement motor cycle engine. This machine had two ski-like skids, and was tested over snow, but the experiments met with little success, the machine never leaving the ground, owing, no doubt, to insufficient power and the incorrect location of line of thrust. The next move was to construct the large man-carrying glider (*b*) Fig. 1, and this was completed in 1906. It had an area of 35 sq. m., with a span of about 12 m., and weighed, light, 164 kg. It was built up in three sections, the central section being supported on a skid under-carriage. In the centre, near the leading edge, an opening was cut in the plane for the pilot, who stood upright and held on to the cross beam in front of him. By swaying his body he could, to a certain extent, correct any rolling or pitching of the glider, caused by wind gusts, &c., but there was no other means of control. With 70 kg. sand ballast numerous successful glides were made, some about 300 m. in length, whilst equally encouraging glides were effected with Wels on board. On the 2nd of October, 1906, three flights of 150, 180 and 225 m. in length respectively were accomplished, the average height being about 10 m. Four more glides were made on October 8th. All these glides were started by running the glider on a small truck down an incline of 28 per cent., the glider "taking the air" when a certain speed was reached. When gliding the speed attained was from 13 to 15 m. per second, whilst the gliding angle was 7° or 8°.



The evolution of the Etrich Taube.

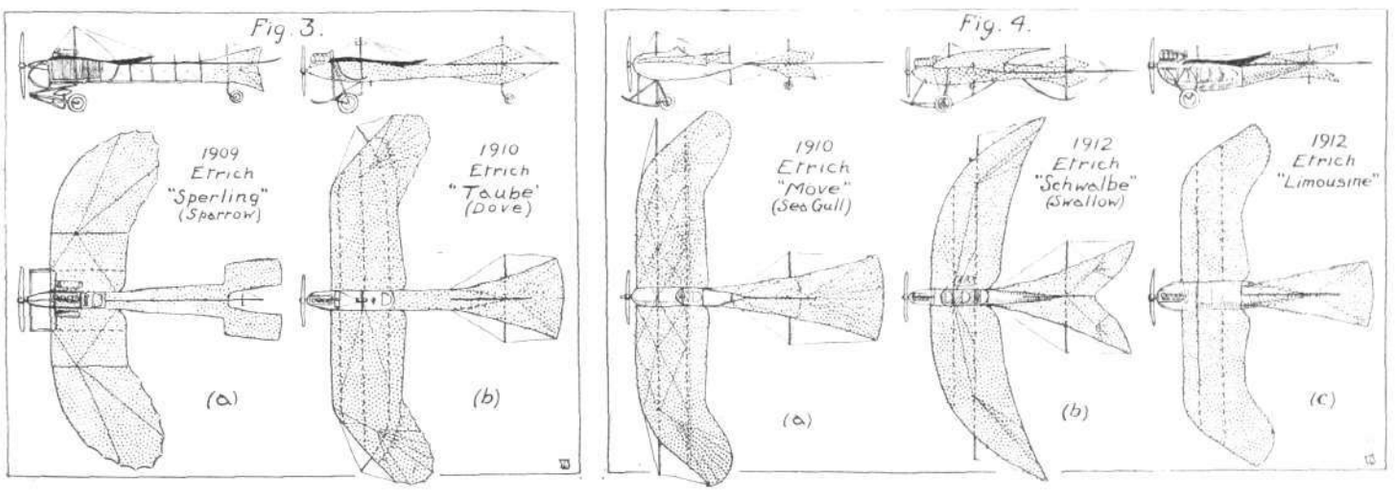
The experiments of Santos Dumont prompted Etrich to try once more power-driven flights, this time on a larger scale, so a 24 h.p. Antoinette engine was obtained and installed in the glider as shown in (*b*) Fig. 2. It will be seen that the planes still followed very closely the Zanonia leaf, but in order to effect better directional control a small elevator was fitted in front close up to the leading edge, whilst it was also possible to flex the wing tips. The engine was mounted below the plane in the under-carriage frame, and drove by means of a chain a crude form of variable-pitch propeller located slightly below, and almost in the centre of the plane, a portion of the latter being cut away so as to clear the propeller. The pilot was seated in much the same position as on the glider, and controlled the elevator by means of the pedal, the wing tips and the pitch of the propeller blades being operated by hand wheels. The under-carriage consisted of two solidly-built skids, and a pair of running wheels, supporting the plane about 1 m. above it by bamboo struts. This machine had a span of about 10 m., and an overall length of 5·4 m., the chord at the centre being 4·25 m. Etrich had originally intended fitting a 50 h.p. engine, but Wels favoured one of smaller horse-power, and persuaded him to fit the 24 h.p. engine. The ultimate trials, however, proved

that this was by no means a powerful enough engine, and once again they failed to obtain extended flights. It is true that one or two hops were made, but these, it must be owned, were due to sudden wind gusts. However, they continued experimenting along these lines, making various alterations in design. For instance, the second trials, in 1908, were made with a tractor machine (*b*) Fig. 2. The Zanonia-form plane remained much the same, and the 24 h.p. Antoinette engine was still employed, but the whole machine was considerably lighter. The engine was mounted forward under the plane, and drove a tractor screw direct, whilst the pilot sat behind the engine, also under the plane. The under-carriage consisted of a simple framework to which was sprung, by means of full elliptic springs, a pair of running wheels. Behind the latter were two skids which prevented the machine from tilting over backwards. Although in some respects a distinct improvement on the previous model, this machine also was a failure, and did not appear to possess the stability of the original glider, whilst the advisability of fitting an elevator was also demonstrated. It was not until the next year, 1909, that Etrich, working on his own account—Wels having left him—achieved any notable success, making short flights on the

types, the leading edge being straight for more than one-third the span, the wing tips swept back and only slightly up-turned. They were built up in three sections, and had a total area of 30 sq. m., the angle of incidence being 8°.

The tail consisted of a long narrow surface extending from the wings and branching into a fork at the rear, forming two rectangular surfaces. These acted as elevators, and were peculiar in that they were up-turned. In between the elevators was a vertical fan-shaped warping rudder. The whole of the tail was carried by a girder structure consisting of two longitudinals, one above the other. In its original form the under-carriage was a clumsy affair, as shown, but later a more efficient type was fitted, somewhat similar to that of the Blériot. The engine, a 53 h.p. water-cooled Clerget, was mounted in the front of the rather wide body frame, with the radiators on either side. Behind the engine sat the pilot. On this machine Etrich put up several successful flights—real flights this time—ranging from 300 m. to $4\frac{1}{2}$ km. in length at a speed of about 70 kms. per hour. He found it very stable, and on several occasions flew without operating the control.

From the experience obtained with this machine Etrich,



The evolution of the Etrich Taube.

old Wels-Etrich machine. He had made several alterations to this machine, (*c*) Fig. 2, notably the fitting of a front elevator, a rear vertical rudder, and a propeller mounted immediately behind the trailing edge. He also subsequently fitted an Anzani engine in place of the Antoinette. The first flight on this old machine was made on July 20th, when a distance of nearly 100 m. was flown, after which several other "hops" were accomplished from time to time until it "disintegrated" in September the same year. In the meanwhile, Etrich was engaged in the construction of an improved type of machine on the Zanonia principle, for although he had made the old machine fly there was a marked lack of the stability experienced with the glider. He was, however, convinced he was working in the right direction, and his new machine, completed in the summer of 1909, bore out his convictions during its ultimate trials. Etrich I, "Sperling" or "Sparrow," (*a*) Fig. 3, embodied in a crude way the main characteristics of the present-day Taube—tractor screw, engine mounted right in front, modified Zanonia-form wings, and elevator-rudder-tail-planes mounted on a *fuselage* extending rearwards from the wings. The latter were not so crescent-shaped as those on the previous

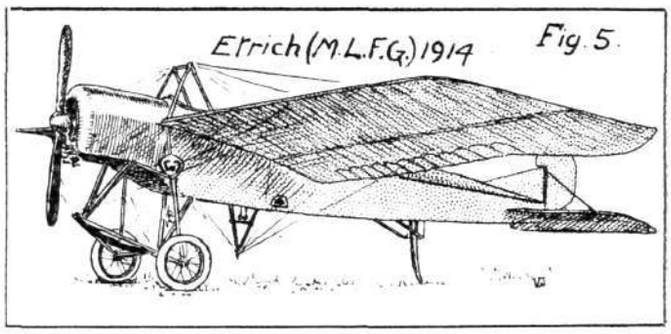
during the latter part of 1909, got out the design of a second machine, Etrich II, the "Taube" or "Dove," (*b*), Fig. 3, which was the first of numerous subsequent "Tauben" that differed but little from the Etrich II. Illustrations of various Etrich monoplanes that have appeared in FLIGHT from time to time,* show how the design remained practically the same throughout, the only differences being in dimensions and constructional details. Etrich II had a span of 14 m., a supporting surface of 32 sq. m., and an overall length of 10 m. The wings had a somewhat different shape to the predecessors, the leading edge being straight for nearly the whole span, and only the extremities swept back and up-turned. They were in two sections, one mounted on either side of a covered-in body, in the orthodox style, and cable braced from a central A mast on the body. Subsequently a girder understructure, extending from the body under the wings, was employed as an additional bracing, which formed a feature of nearly all Etrich machines until quite recently. The tail consisted of a horizontal fan-shaped surface,

* Vol. II, p. 377; Vol. III, pp. 382 and 973; Vol. V, p. 1127; and Vol. VI, p. 899.

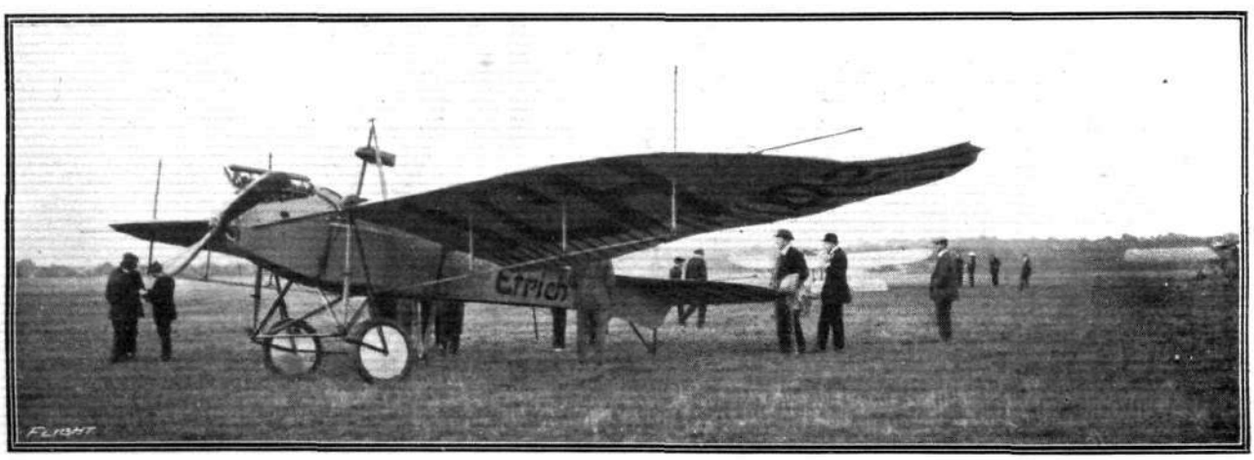
mounted on the top of the body, with a flexible trailing edge acting as an elevator. Above and below this were two diamond-shaped vertical surfaces, which acted as fins and rudders. The engine, a 50 h.p. Clerget, was mounted in the nose of the body, and drove a tractor screw direct, whilst the pilot sat in a cockpit behind. The original under-carriage was of the Blériot type, with a central hockey-like skid. A large number of important flights were made on this machine—completed at the end of 1909—with the result that several replicas were constructed.

The next machine to be built (in 1910), however, was more or less an experiment, and differed somewhat in construction. The main difference, as will be seen on referring to (*a*), Fig. 4, consisted of the short streamline body and the landing carriage. The former terminated just behind the wings, which had a similar plan-form as Etrich II, where the tail commenced—a similar practice to that followed just recently by Fokker on his monoplanes. The wings were braced to a central A mast and by four king posts, a wheel being fitted to the lower extremities of each outer king post. The under-carriage consisted of a single central skid, behind which was sprung a wheel. The engine, a 60 h.p. Clerget, was mounted in the nose of the body, and the pilot sat behind. This machine had a span of 15 m., a supporting area of 32 sq. m., and a length of 10 m., its total weight, ready for the air, being 460 kgs. It had a speed of 80 kms. per hour.

Another experimental machine was the "Schwalbe" or "Swallow," (*b*) Fig. 4, built in 1912. The wings of this machine were almost true crescent-shape, the leading edge being curved from tip to tip. They were set at a dihedral angle and upturned at the tips, and the right-hand wing had a small window formed in it close to the body. The flexing elevator-tail was swallow-shape, and had the usual two diamond-shaped rudder-fins above and below it. The body, circular in section, was built up of tubular steel longitudinals and wooden rings, the whole being covered with fabric. In the nose of the body was the 60 h.p. engine, with the radiator immediately behind it. Behind this were three seats, one behind the other, the last being the pilot's. The control consisted of a vertical column and wheel, a backwards and forwards movement of the former operating the elevator, and a rotating of the latter actuating the rudders; no wing warping was employed, the flexibility of the wings alone being relied upon to maintain lateral stability. The chassis consisted of a central skid connected to the body by three pairs of V struts, and a sprung axle carrying a pair of wheels. The "Swallow," which was constructed mostly of steel, had a span of 13·25 m., an overall length of 8·7 m., weighed 45 kgs., and had a speed of 112 kms. per hour with three up. Another machine, (*c*) Fig. 4, was a totally enclosed military monoplane built in 1912. The wings were of orthodox Etrich form, cable braced top and bottom, having a span of 12 m. The fish-shaped body was built up of wooden channel-section longitudinals, and wooden rings, covered with sheet aluminium from the nose to just behind the wings, and with fabric for the remainder. The wings were attached to the body high up, and the sides of the body underneath were cut so as to form windows. Inside the body were four seats, two pairs in tandem, the pilot being at the rear. The windows were of wire gauze and celluloid. A 60 h.p. Austro-Daimler engine was mounted high up in the nose of the body. The undercarriage consisted of a tubular axle and pair of wheels connected to the body by four tubular steel struts. Later this machine was altered, the seats were placed higher up, so that the pilot and passenger protruded above the body, whilst an additional wheel was mounted under the nose. Neither of these two machines showed to any particular advantage, and did not, therefore, form an important part of the Etrich programme. Fig. 5 shows the latest form of Etrich monoplane. The wings are of a modified Etrich form, with the tips only slightly swept back and upturned. They are cable braced in the orthodox monoplane style. The tail is of the hinged elevator type, with a partially balanced rudder and vertical fin above it. The body somewhat resembles that of the Morane-Saulnier, the pilot and passenger being similarly seated. The engine is an 80 h.p. Gnome, mounted in the nose of the body under a metal cowl. The under-carriage consists of a central short skid connected to the body by two pairs of V struts, and a divided axle, carrying a pair of wheels. The outer ends of the axle are connected to the body by two shock-absorbing rods.



The evolution of the Etrich Taube.



The 1913 Etrich Taube.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

SPECIAL COMMITTEE MEETING.

A SPECIAL Meeting of the Committee was held on Tuesday, the 9th inst., when there were present: Prof. A. K. Huntington, in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. C. F. Pollock, and the Assistant Secretary.

New Members.—The following New Members were elected :—
Ronald Thomas Hilliard Duff.
Flight Lieut. Charles Robert Finch Noyes, R.N.A.S.
Lieut. Sydney Reynolds Hibbard, R.N.V.R.
Lieut. Aubrey Fairer Smith, R.N.V.R.

Aviators' Certificates.—The granting of the following aviators' certificates was confirmed :—

1041 Lieut. Myles Teignmouth Sandys, R.G.A. (Maurice Farman Biplane, Netheravon Flying School, Netheravon). Dec. 25th, 1914.
1042 2nd Lieut. Harold William Medlicott, R.F.A. (Maurice Farman Biplane, Military School, Brooklands). Jan. 18th, 1915.
1043 Ernest Edwards Hodgson (Maurice Farman Biplane, Military School, Brooklands). Jan. 19th, 1915.
1044 Louis William Yule (Maurice Farman Biplane, Military School, Brooklands). Jan. 21st, 1915.
1045 Flight Sub-Lieut. Frank Besson, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Jan. 23rd, 1915.
1046 2nd Lieut. Selden Herbert Long (Durham Light Infantry), (Maurice Farman Biplane, Military School, Brooklands). Jan. 25th, 1915.
1047 Ernest Greenwood (Grahame-White Biplane, Grahame-White School, Hendon). Jan. 26th, 1915.
1048 Lieut. Edgar Bannatyne (19th Hussars), (Wright Biplane, Beatty School, Hendon). Jan. 26th, 1915.
1049 Flight Sub-Lieut. John Stanley Mills, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Jan. 26th, 1915.
1050 John Lloyd Williams (Hall Biplane, Hall School, Hendon). Jan. 26th, 1915.
1051 Flight Sub-Lieut. Terence Felix Driscoll, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Jan. 26th, 1915.
1052 Sergt. Hugh McKenna, R.F.C. (Maurice Farman Biplane, Royal Flying Corps, Netheravon). Jan. 17th, 1915.
1053 Flight Sub-Lieut. Frederick Joseph Rutland, R.N. (Short Biplane, Royal Naval Flying School, Eastchurch). Jan. 26th, 1915.
1054 Charles Drury Fuller (Maurice Farman Biplane, Military School, Brooklands). Jan. 28th, 1915.
1055 Edward Ernest Clarke (Maurice Farman Biplane, Military School, Brooklands). Jan. 28th, 1915.
1056 2nd Lieut. John Ronald McCrindle (7th Gordon Highlanders) (Maurice Farman Biplane, Central Flying School, Upavon). Jan. 28th, 1915.
1057 Clive F. Collet (L. and P. Biplane, London and Provincial School, Hendon). Jan. 29th, 1915.
1058 Jack Oliver Cooper (Maurice Farman Biplane, Military School, Brooklands). Jan. 29th, 1915.
1059 Gerald Merton (Wright Biplane, Beatty School, Hendon). Jan. 29th, 1915.
1060 Flight Sub-Lieut. John Daniel Newberry, R.N.A.S. (Wright Biplane, Beatty School, Hendon). Jan. 30th, 1915.
1061 Flight Sub-Lieut. Graham Donald, R.N.A.S. (Wright Biplane, Beatty School, Hendon). Jan. 30th, 1915.
1062 2nd Lieut. Maximilian Knight Cooper-King (7th Batt. York and Lancaster Regt.) (Maurice Farman Biplane, Military School, Brooklands). Feb. 1st, 1915.
1063 Harold MacDonnell O'Malley (Maurice Farman Biplane, Military School, Brooklands). Feb. 1st, 1915.
1064. Lieut. Jacob Guy Swart, R.H., and R.F.A. (Maurice Farman Biplane, Royal Flying Corps, Shoreham). Jan. 25th, 1915.
1065. Flight Sub-Lieut. Edward Thomas Anstey Chave, R.N.A.S., (Wright Biplane, Beatty School, Hendon). Jan. 26th, 1915.
1066 Flight Sub-Lieut. Stephen Medlicott, R.N.A.S. (Maurice Farman Biplane, Central Flying School, Upavon). Jan. 28th, 1915.
1067 Flight Sub-Lieut. Oswald Noel Walmesley, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Jan. 29th, 1915.
1068 Flight Sub-Lieut. Cyril Napier Leeston-Smith, R.N.A.S. (Wright Biplane, Beatty School, Hendon). Feb. 1st, 1915.
1069 Flight Sub-Lieut. Frank Thomas Digby, R.N.A.S. (Grahame-White Biplane, Grahame-White School, Hendon). Feb. 1st, 1915.
1070 Capt. Frank Walker Smith (Maurice Farman Biplane, Royal Flying Corps, Shoreham). Feb. 1st, 1915.

The following Aviators' Certificates were granted :—

1071 Flight Sergt. Michael Keegan, R.F.C. (Avro Biplane, Royal Flying Corps, Netheravon). Jan. 29th, 1915.
1072 Flight Sub-Lieut. Bertram Denison Kilner, R.N.A.S., (Short Pusher Biplane, Royal Naval Flying School, Eastchurch). Feb. 1st, 1915.

ANNUAL GENERAL MEETING.

The Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Tuesday, March 23rd, 1915, at 5 o'clock, at 166, Piccadilly, London, W.

Notices of Motion for the Annual General Meeting must be received by the Secretary not less than twenty-one days before the Meeting, and must be signed by at least five Members. The last day for the receipt of notices of motion is Tuesday, March 2nd, 1915.

Committee.

In accordance with the rules, the Committee shall consist of eighteen Members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring Members of the Committee are :—

Griffith Brewer.	Flight Commander F. K. McClean, R.N.A.S.
Ernest C. Bucknall.	
John D. Dunville.	Alec Ogilvie.
Col. H. C. L. Holden, C.B., F.R.S.	Mervyn O'Gorman, C.B.
Prof. A. K. Huntington.	C. F. Pollock.

Any two Members of the Club can nominate a Member to serve on the Committee, provided the consent of the Member has been previously obtained. The name of the Member thus nominated, with the names of his proposer and seconder, must be sent in writing to the Secretary not less than fourteen days before the Annual General Meeting. The last day for the receipt of nominations is Tuesday, March 9th, 1915.

A ballot paper for the election of nine Candidates to the Committee of the Club will be forwarded to each Member at least seven days before the date of the Annual General Meeting.

THE FLYING SERVICES FUND.

Administered by The Royal Aero Club.

THE Lords Commissioners of the Admiralty and the Army Council having signified their approval, the Royal Aero Club has instituted and will administer a fund originated by M. André Michelin for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependents of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

In view of the great utility of the work of the Flying Services, evidence of which has been repeatedly given in the official despatches of the Commander-in-Chief, the

skilful and daring flights into enemy country, and the protection afforded by the continuous patrolling of our coast by aircraft, it is confidently expected that the British public will welcome this opportunity of showing their appreciation by subscribing promptly and liberally to the fund.

The Right Hon. Lord Kinnaird has kindly consented to act as Honorary Treasurer to the Fund.

Subscriptions should be forwarded to The Flying Services Fund, The Royal Aero Club, 166, Piccadilly, London, W., or to Barclay and Co., Ltd., 1, Pall Mall East, London, S.W. Cheques should be crossed "Barclay and Co., Ltd."

TULLIBARDINE, Brig.-General,
Chairman of the Royal Aero Club.

The following subscriptions have been received up to the 10th inst. :—

	£	s.	d.
A. Michelin ...	1,000	0	0
The Royal Aero Club	1,000	0	0
J. E. Pearce... ...	5	0	0
C. G. Grunhold ...	5	0	0
Noel Pemberton Billing	5	0	0
C. G. Grey	5	0	0
Flight-Lieut. F. K. McClean, R.N.A.S.	1,000	0	0
Alec Ogilvie	250	0	0
Griffith Brewer ...	100	0	0
Paris Singer	100	0	0
James Radley ...	25	0	0
T. O. M. Sopwith	1,000	0	0
W. Oswald Watt ...	20	0	0
A. Mortimer Singer	100	0	0
Arthur Sykes ...	1	1	0
J. K. Burbridge ...	5	0	0
Ernest H. Coles ...	5	0	0
Oscar Coles	5	0	0
Norman Clark Neill	100	0	0
A. J. A. Wallace Barr	5	5	0
Editor FLIGHT ...	10	10	0
Henry Wagner ...	5	5	0
Lady Tredegar ...	5	0	0
The Hon. Lady Shelley	5	0	0
C. H. B.	2	0	0
C. Capron	1	1	0
Mrs. R. S. Henderson	2	2	0
Mervyn O'Gorman, C.B.	5	5	0
P. J. Taylor ...	10	10	0
Harry Preston ...	5	5	0
Charles E. Shepheard	5	5	0
Mrs. Krabbé ...	50	0	0
R. A. Wall	5	5	0
"Rat"	1	1	0
E. C. Wynne ...	0	10	6
Rev. Geo. H. Ford...	1	0	0
Mrs. Mortimer Singer	5	0	0
Mrs. George Cumming	5	0	0
Mrs. Carleton Tufnell	50	0	0
Miss Primrose ...	10	0	0
F. L. Bartelt ...	1	1	0
J. J. Acworth ...	21	0	0
W. H. Willcox ...	5	5	0
G. S. Wilson ...	5	5	0
L. S. Snell	0	12	0
Sir Francis Layland-Barratt, Bart. ...	52	10	0
Washington Wood ...	5	5	0
W. J. Leonard ...	5	0	0
W. Mair Rolph ...	5	5	0
J. Duncan Pearson ...	1	1	0
Oliver W. Thomas ...	5	0	0
G. G. Astley... ...	1	1	0
Mr. and Mrs. W. Willoughby Price ...	5	0	0
A. V. Roe and Co., Ltd., on account ...	100	0	0
Francis J. Sharpe ...	5	0	0
Capt. E. W. Wakefield	2	2	0
The Integral Propeller Co., Ltd.	10	10	0
Auguste Oddenino ...	2	2	0
J. E. Rosen	1	1	0
F. Warren Merriam...	5	0	0
Ernest C. Bass ...	10	10	0
G. A. Scott	2	2	0
Rubery, Owen & Co.	10	10	0
Miss Curtis	2	2	0
J. and A. W. Sully and Co.	2	2	0
Members and Friends of "The Midhurst Musical Society"...	5	0	0
Anonymous	1	1	0
W. N. Child... ...	5	0	0
J. Samuel White and Co., Ltd.	100	0	0
Miss McClean ...	10	0	0
Eng.-Com. H. J. Meiklejohn, R.N.	2	0	0
J. H. Picard... ...	5	5	0
Stevenson and Son, Ltd.	2	2	0
Andrew Rutherford...	1	1	0
Thomas Armstrong...	1	0	0
Miss Marion M. Hill	0	10	0
W. Ridley Prentice...	10	10	0
D. Lawrence Santoni	10	10	0
J. E. Huson... ...	5	5	0
W. M. G. Singer ...	50	0	0
Mrs. Webb	5	0	0
Alfred Grafton ...	5	5	0
Mrs. C. A. de Beauvoir Stocks ...	3	3	0
Miss Rose Robinson	0	2	6
The Sunbeam Motor Car Co., Ltd. ...	100	0	0
Willans and Robinson, Ltd.	5	0	0
Anonymous	1	1	0
The Hon. Mrs. Assheton Harbord ...	5	0	0
Anonymous	1	1	0
J. J. Hewitt	2	2	0
W. M. Sherreft ...	2	2	0
Mrs. and Miss Robertson	1	2	6
Mrs. H. J. Erskine...	5	0	0
R. W. Adamson ...	10	10	0
W. R. Mosley ...	5	0	0
Capt. and Mrs. O. Schwann	10	0	0
Miss M. Anderson ...	0	10	6
T. Gowland	1	1	0
A. Norman Dugdale	5	0	0
Miss A. L. Bolton ...	5	0	0
Taylor and Francis ...	3	3	0
The late Maurice Leigh Gardner	5	0	0
C. E. A. Hartridge...	10	10	0
Miss Ellinor Allen ...	2	0	0
The Mayor of Loughborough	1	1	0
J. Lobley	3	3	0
Wm. Harland and Son	100	0	0
Vivian A. Simon ...	2	2	0
The Mayor of Keighley	1	1	0
R. W. Coan... ...	1	1	0
Mrs. Penk	5	0	0
Mrs. R. Egerton ...	1	0	0
M. G. Christie ...	1	1	0
G. Ward Grazebrook	5	0	0
N. Hardingham ...	1	1	0
William Mallinson and Sons, Ltd. ...	25	0	0
H. H. L. Lewis ...	2	2	0
"Anon"	2	0	0
Mrs. A. L. Wingate	5	5	0
Charles C. C. Cotton	2	2	0
Miss Dorothy Vaughan Morgan	2	2	0
L. A. Dent	1	1	0
F. B. Ford	1	1	0
Lancelot L. Vigers ...	1	1	0
A. B. Potter... ...	1	1	0
Miss Mary Gillmore	1	0	0
W. Naylor Spence ...	26	5	0
C. H. Cazaly ...	1	0	0
F. L. Keegress ...	0	15	0
Miss Dorothy Pennington	0	10	6
Miss Clara E. A. Moore	0	5	0
Mrs. A. E. Nicholson	1	0	0
A. Neale	0	10	0
Charles Griffith ...	0	10	0
James E. Withers ...	50	0	0
H. R. Miller ...	5	0	0
Lieut.-Col. A. C. Borton	10	10	0
Thos. Fair	5	0	0
W. F. Heddon ...	5	0	0
Miss E. J. Shawcross	2	2	0
Mrs. C. H. Crombie	0	2	6
Miss Margaret Woollcombe	0	1	0
Miss C. I. Isaac ...	0	2	6
C. G. Spencer & Sons	2	2	0
Misses Withers ...	0	10	0

166, Piccadilly, W. B. STEVENSON, Assistant Secretary.

FROM THE BRITISH FLYING GROUNDS.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday last week, Probationary Flight Sub-Lieuts. Digby, Hallifax, Hilliard, Petter and Wood, circuits, eights, &c., afterwards F. Digby going in for *brevet* tests and gaining certificate in first rate style. Probationary Flight Sub-Lieuts. Irving straights with Instructors Manton and Winter, and Souray solo straights and half circuits, later solo circuits.

Tuesday, Wednesday and Thursday pupils kept in owing to high winds.

Friday, Probationary Flight Sub-Lieuts. Irving straights with Instructor Russell; Petter circuits with Instructor Manton; Souray and Wood solo circuits.

Sunday, Probationary Flight Sub-Lieuts. Hallifax, Hilliard and Wood, circuits, eights, &c. Irving and Tollemache (new pupil) straights with Instructors Manton and Russell. Petter circuits, landing practice.

Beatty School.—Pupils out receiving instruction during last week with Mr. Geo. W. Beatty and G. Virgilio on 60-70 h.p. Wright-engined biplane and 50 h.p. Gnome-engined biplane, each fitted with "dual" controls, were :—Messrs. P. E. Cornish (25 mins.), G. Beard (25), G. Perrot (20), T. F. Roche (5), B. de Meza (15), M. J. V. Miller (20), J. H. Ormsby (15), A. G. Hayward (12), H. H. Bright (38), F. R. Laver (22) and J. H. Moore (20).

The new *brevet* machine has now made its appearance, and should prove a valuable addition to the school, besides making the pupils acquainted with a fast light machine.

Hall School.—Pupils with Instructor J. Rose on machine during last week: Davy, Waterson and McConnochie. Two new pupils joined the school, Lieut. E. J. Moncrieffe and J. Furlong. Much useful instruction was given to pupils in the hangars owing to the bad weather during the week.

London and Provincial Aviation Co.—Monday, last week, school out at 7.45 a.m. Instructors: W. T. Warren, M. G. Smiles. Test flight W. T. Warren, 10 mins.; Messrs. Abel and Laidler, circuits on No. 2, latter improving rapidly; Messrs. Moore and Bransby Williams, half-circuits: Messrs. Noakes and England Derwin, straights; Mr. Lincoln rolling.

Friday, out 8 a.m. Weather unfavourable. Test flight, M. G. Smiles; Messrs. White and Lincoln rolling.

Sunday, out 7.45 a.m. Test flight, M. G. Smiles, 10 mins.; Mr. Moore circuits on No. 2, improving;

Mr. Clive F. Collett, who has passed for his *brevet* at the London and Provincial Flying School at Hendon.

Messrs. Noakes, England Derwin, and Lincoln straights ; Mr. Lincoln making good progress.

Ruffy-Baumann School.—During last week the instructors were Messrs. Baumann, Herbert and Howard James.

Pupils receiving instruction: Monday, Kenworthy, 25 mins. ; King, 12.

Tuesday, Wednesday, Thursday, Friday, Saturday, weather too bad for pupils in the air. Sunday, Mr. King, 10 mins.

Machines in use: 60 h.p. Gnome, Caudron, dual control, and 45 Anzani.

Northern Aircraft Co., Ltd.

The Seaplane School, Windermere.—Monday, last week, Mr. R. O. Lashmar up for practice flight. Mr. Rowland Ding gave instruction to R. Buck (31 mins.), G. L. Railton (15), A. Johnson (54). Messrs. A. Johnson and R. Buck out alone later.

Saturday, Mr. Rowland Ding gave instruction to Messrs. R. Buck, A. Johnson and S. J. Sibley.

Heavy rains and a gale restricted work considerably, but students had time to put in some useful practical work ; and on Tuesday Mr. C. Fleming Williams gave an illustrated lecture on "Construction and Design."

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AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

IN the despatch dated Febuary 2nd from an "Eyewitness" present with the British General Headquarters, published on Monday, there were the following references to aviation :—

"Saturday, January 30th, was bright and warm. . . . Among other successes our shells set fire to a building which was being much used by the enemy in a village east of Neuve Chapelle, and with the assistance of our aircraft a direct hit was made on a German gun near Frélinghien. A hostile column of infantry observed by our aeroplanes on a road opposite our right centre was subjected to a heavy fire, which, it is believed, inflicted considerable loss. On the right similar results were reported, such as the blowing up of an ammunition wagon and what was apparently a magazine behind the enemy's trenches. . . . .

"On the rest of our line there is little to report. A hostile aeroplane dropped four bombs near the Lys, without doing any damage."

In the despatch, dated February 5th, from "Eyewitness," issued on Tuesday, there was the following :—

"One of our aviators dropped ten bombs on the aerodrome at Lille, which are believed to have been effective, while a German airman flew over Bailleul and threw two bombs without inflicting damage. . . . .

"The enemy's aircraft were very active, especially on the left, where they endeavoured to reconnoitre the positions of our trenches and batteries. As usual, however, their aeroplanes declined to engage ours, and made for their own lines when approached. The ascendancy obtained by our aviators was once again shown by an incident which occurred on this day. One of our machines endeavoured to engage two hostile aeroplanes, which thereupon turned towards home. They descended to their own lines ; but their pursuer, determined not to be baulked of his prey, though they had reached their aerodrome, threw two bombs on them, then fired fifty rounds at them, and flew away.

"A German machine flew over Hazebrouck and dropped bombs, which injured two women. A man who was cleaning a window had an extraordinary escape, for although the window was shattered, and the interior of the room wrecked, he was untouched.

"The past few days have been fine and warm, and our aircraft have taken every advantage of the favourable weather. It has also enabled our artillery to obtain especially good results against the hostile batteries."

In the official despatch issued in Paris on the 30th ult., dealing with the operations up to the 26th ult., it was stated :—

"Nothwithstanding unfavourable atmospheric conditions our aeroplanes regularly undertake reconnoitring duties, and frequently give chase to German aircraft. On several occasions the chase was successful.

"On the night of January 22nd our aeroplanes bombarded the German camps in the neighbourhood of La Fere, and caused great commotion among the enemy."

In the official French *communique* issued on the evening of the 4th inst., it was stated :—

"The very effective fire of our artillery in the valley of the Aisne reduced enemy batteries to silence, caused explosions in the ammunition wagons, dispersed working parties, and put aircraft to flight.

"In front of Verdun we brought down an aeroplane and captured the aviators."

In the French *communique* issued on the afternoon of the 5th inst., it was stated :—

"In Belgium, the German aviators showed great activity."

Later on the same day the following official note was issued in Paris :—

"An aeroplane dropped bombs on Saint Dié. Four victims are reported among the civil population."

In the *communique* issued in Paris on Saturday afternoon, it was stated :—

"We have brought down a captive balloon over the German lines to the north-east of Sommepy."

A semi-official note issued in Paris on Tuesday afternoon stated :—

"Between the Oise and the Aisne our artillery brought down a Taube, which fell in the German lines all ablaze."

In a *communique* issued by the Russian Great General Staff on Sunday evening it was stated :—

"One of our army corps, to which was assigned the task of taking the offensive in the direction of Mezo-Laborcz, captured between January 26th and February 5th eleven field guns, two mountain guns, two bomb mortars, 22 machine-guns, an aeroplane, many telephones and arms, two commanders of regiments, more than 170 officers, and more than 10,000 rank and file."

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THE BRITISH AIR SERVICES.

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, *it is not repeated in this column.*

Royal Naval Air Service.

THE following was announced by the Admiralty on the 5th inst.

Temporary Flight Lieut. F. K. McClean promoted to the rank of temporary Acting Flight Commander, with seniority Feb. 2nd.

Flight Sub-Lieut. (temporary) J. D. Newberry to the "Pembroke III" for Royal Naval Air Service. To date Feb. 4th.

The following was announced by the Admiralty on the 6th inst. :—

Flight Sub-Lieut. J. M. D'Arcy has been promoted to the rank of Flight Lieut., with seniority Feb. 1st.

Probationary Flight Sub-Lieuts. C. N. Leeston-Smith to the "Pembroke III," to date Feb. 5th, and E. F. Bray, E. J. Hodsoll, E. I. M. Bird, P. C. V. Perry, T. Hinshelwood, J. C. Brooke, and C. H. Chichester Smith to the "Pembroke III." To date Feb. 1st, all for Royal Naval Air Service.

G. Donald, entered as probationary Flight Sub-Lieut. and appointed to the "Pembroke III," for Royal Naval Air Service. To date Feb. 5th.

The following appeared in the *London Gazette* issued on the 5th inst. :

The following gentleman has been granted a temporary commission as Flight Lieutenant : Farnall Thurston. Dated Dec. 7th, 1914.

The following gentleman has been granted a temporary commission as Flight Lieutenant : Collyns Price Pizey. Aug. 4th, 1914.

The following was announced by the Admiralty on the 8th inst. :—

J. B. P. Ferrand has been entered as Probationary Flight Sub-Lieutenant and appointed to the "Pembroke III," additional, for Royal Naval Air Service. To date Feb. 6th.

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Royal Flying Corps (Military Wing).

THE following appeared in a supplement to the *London Gazette* issued on the 4th inst. :—

The undermentioned appointment is made :

Flying Officer : Second Lieut. George C. N. Nicholson, Special Reserve. Dated Jan. 1st, 1915.

The following appeared in the *London Gazette* issued on the 5th inst. :—

The appointment of Second Lieut. F. P. Adams, Special Reserve, to be a Flying Officer, notified in the *London Gazette* of December 24th, 1914, is antedated to Aug 7th, 1914.

The following appeared in a supplement to the *London Gazette* issued on the 6th inst. :—

Special Reserve. Supplementary to Regular Corps.—Second Lieut. (on probation) Owen B. Howell resigns his commission. Dated Feb. 7th, 1915.

The following appeared in a supplement to the *London Gazette* issued on the 8th inst. :—

The undermentioned appointments are made :

Flight Commanders ; dated Jan. 27th, 1915 : Lieut. Patrick H. L. Playfair, Royal Artillery, from a Flying Officer, and to be temporary Captain ; Lieut. Alexander Shekleton, the Royal Munster Fusiliers, from a Flying Officer, and to be temporary Captain ; and Capt. Hugh C. T. Dowding, Royal Artillery, from a General Staff Officer, Third Grade.

The appointment of Second Lieut. James Valentine to be a Flying Officer, notified in the *London Gazette* of Dec. 15th, 1914, is antedated to Aug. 6th, 1914.

The following appeared in the *London Gazette* issued on the 9th inst. :—

The Lancashire Fusiliers.—Quartermaster-Sergeant Henry Edward Chaney, from School of Musketry, to be Second Lieutenant, and is seconded for service with the Royal Flying Corps. Dated Feb. 10th, 1915.

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The Work of the Royal Flying Corps.

IN introducing the Army Estimates in the House of Commons on Monday last, Mr. Tennant, Under Secretary for War, said that with regard to the Flying Corps, he thought it had been proved beyond doubt that the British design of aeroplane had shown itself superior to that of of any other nation. That was due to the Royal Aircraft Factory, initiated by Lord Haldane, and the fact that so much progress has been made in the design was largely due to the work of Colonel Seely. The workmanship and the material put in was so good that our aeroplanes lasted almost twice, if not quite twice, as long as those of any of the other Powers concerned. The engines in our existing aeroplanes were almost entirely French, and he desired to express the Government's acknowledgment to the French Government for the very valuable assistance which they had rendered to us. But we were gradually, and he could now say actually, becoming self-supporting in the matter of aeronautical material. The first British-made engines were now in use in our aeroplanes, and it would not be very long before British-made engines would be sent out to the front. Those who were engaged in the motor trade and in shipbuilding had readily responded to the request made to them by the Government, and were manufacturing aeroplanes in considerable numbers. Recruiting for the Royal Flying Corps was extraordinarily good, and the class of men they were getting in the ranks was very high. The officers were splendid, and a large number of gentlemen were anxious to join the Royal Flying Corps. In the operations so far as they had gone British pilots had proved themselves on every occasion, without exception, superior to the German pilots.

The Zeppelin Raid.

IN the House of Commons on Monday, Mr. Ingleby, the member for King's Lynn, asked how many Zeppelins raided the East Coast on January 19th ; whether the Zeppelins were accompanied by motor-cars ; if so, whether he could give the number of such cars ; and whether any of them had been identified or any of their occupants arrested.

Mr. Tennant, the Under Secretary for War, replied : It is not in the public interest to give any information which may be in possession of the Department in regard to the first point. The other points are being investigated, and I hope to give an answer shortly.

On Tuesday Sir W. Bull asked the Prime Minister whether his attention had been directed to the allegation that a German airship in a recent raid on the Norfolk coast was guided by signals from two motor cars.

Mr. McKenna, the Home Secretary, replied that after careful investigation the Norfolk constabulary traced eight cars which were on the road about the times, and places that the Zeppelins passed. The cars had been identified, and in each case their movements had been satisfactorily explained. The occupants of the cars were all persons against whom there is no possible ground of suspicion.

Mr. McKenna also said that although it was very difficult to be certain of any matter, he was assured by responsible naval and military authorities that the aircraft were Zeppelins.

FLIGHT

EDDIES.

SOME of the highly-coloured and picturesquue stories of happenings with aeroplanes at the front which have emanated from various press agencies may be perhaps excused by reason that they are endeavours to fill a want, ever increasing in its intensity, created by the man in the street. They are certainly amusing at times, and, viewed from a proper perspective, they perhaps do little harm. On the other hand, the really serious efforts made by special correspondents to place detailed accounts of certain happenings before the readers of the leading dailes are beyond praise, although they are at times quite wide of the real facts, because their information is second, third, or even fourth hand—whilst the element of "all things are not what they seem" comes in when the story is given first hand.

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In this connection an instance is available dealing with the air-raiding of Dunkirk. Week by week we publish, by way of record, extracts of aircraft work from various sources, and one of these from one of the leading morning papers, published in our issue of January 29th, gave details of the aerial fight which took place over Dunkirk in January. Many of the "facts" therein, however, require considerable revision, judging by a note which we have since received from "one who saw every incident." For the sake of "history" we reproduce our correspondent's corrected version of this big aeroplane attack. He writes :—

"Captn. Holt, who was alone on the Martinsyde Scout, put up a wonderful show. The German machine (Albatros) had been diving and twisting about over the airship station for ten minutes, trying to avoid the attack of an Army B.E. Then turned out seawards at about 6,000 ft., and was dived on to by Holt, who had been making circles for an hour at about 8,000 ft. waiting his chance. He got within three or four lengths, with the German diving away from him, dropped his controls, blazed off his rifle, and got the pilot with one shot, and two more through the cowl and thence into water jacket round No. 2 cylinder starboard side, tearing it open. Mr. 'Black Crosses' was, of course, '*en panne*,' and glided down to make a perfect landing two miles from the air station just over the Belgian frontier. Here the officers were taken prisoners by hundreds of Belgians, and the British soon got there by car to claim the machine. It was all through the finest 'aerial performance' any of us have been privileged to witness."

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Our correspondent, in addition, points out that only one (not two) of the German aeroplanes was brought down, and that this one had its water jacket (not reservoir) pierced by two shots (not one). It descended at Bray Dunes (not Chyvelde), and the two German officers (the pilot being wounded by Capt. Holt's rifle shot) were not wearing khaki caps. Instead of 6 German aeroplanes making the attack, there were 12 or 13. Subject to these little amendments, the version of our contemporary's "Correspondent in Northern France" may be regarded as tolerably reliable.

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Some time ago, it may be remembered, we published in "Eddies" a report to the effect that Mr. R. J. Lillywhite was said to have had a bad smash in France. This report, it may also be remembered, was contradicted the next week by a letter from a sergeant in the Royal Flying Corps stating that, to the best of his knowledge, Lillywhite had never been in France, but was well and flying in Egypt. At the time I expressed the hope that my informant was correct in his statement, and pointed out that I should appreciate a communication from Lillywhite himself, proving beyond doubt that he was well.

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I am pleased to say that this wish has now been fulfilled ; the following letter, dated Ismalia, Egypt, January 16th, 1915, from Lillywhite is to hand :—

"It was quite a treat to get a look at FLIGHT again (Dec. 25th) to see how things are going, and I am very pleased to be able to tell you that the injuries to myself are *nil*, as I have had no smash at all. I hope that Barrs, by the time you receive this, will be well on the way to recovery. The boys still seem to be doing well overseas, but expect they'll be glad when the warmer weather comes. I hope that you had a jolly Christmas and will have a very happy and prosperous New Year, and that we may all be back at Hendon by this time next year. I am flying a Henry here ; it is a square-tailed 'bus and climbs very well. It is very quiet here at present, but we do a good bit of reconnaissance. It is a grand climate for flying at this time of the year, but I expect it gets a bit bumpy in the summer. Well, I have no news. We get but little here ; we are simply watching and waiting [*According to reports they seem to have been doing a good deal more than that out there lately.*—Æ.]. Trusting you are in the best of palpitation, and again wishing you the best of luck for 1915.—I am, Yours sincerely, J. LILLYWHITE."

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A friend living across "the pond" sends me some interesting points concerning the new flying boat which Glenn Curtiss is building for a trans-Atlantic flight. The new "America," as she will be called, is quite a flying cruiser, and although full detailed information is not available, there is every indication that the new boat will be very much superior to the old one as regards speed and lifting power. The new "America" will be 10 miles an hour faster than the old boat, and is confidently expected to be able to rise from the water with full load on board, including the necessary supply of fuel for a non-stop flight from St. John's, Newfoundland, to the Irish coast. The power plant is to consist of two of the new 160 h.p. Curtiss engines, and the size of the boat portion of the new "America" is also to be greatly increased.

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It is at present intended to carry three men on board for the trip, but there is a possibility that this number may be reduced to two by fitting one of the new Sperry gyroscopic stabilisers. No information is at present available as to the time when the attempt will be made, but a few figures are of interest. The weight of the two engines will be about 1,200 lbs., as against 640 lbs. of the old ones. About 335 lbs. of oil will be carried, and the weight of the whole aeroplane without the power plant will be in the neighbourhood of 2,700 lbs. The total weight is, I understand, expected to be between 8,000 and 9,000 lbs., a by no means small load to lift off the water, but then it must be remembered that the aeroplane portion will be of large size, probably spanning in the neighbourhood of 100 ft. It will be interesting to have results when the new boat has been completed and tested.

"ÆOLUS."

THE ZEPPELIN QUESTION.

COMING from the pen of so well-known a French writer on aeronautical matters as Mons. Georges Prade, the following article on the above subject, which appeared in *Le Journal* of the 2nd inst., has much of interest for our readers, and all those who are at all perturbed at the thought of the "frightfulness" which the Germans promise to perform by means of their airship fleet. M. Prade's views are as follows :—

"The Zeppelin question has become to a certain extent—and, perhaps, entirely so—the question of the day. After not having believed sufficiently in the Zeppelin, there are now people who believe too much in it. Permit one, who has followed the matter from the first, and who has appreciated the splendid efforts of Count Zeppelin, to examine, figures in hand, and in the light of cold reality, the probable actual state of the German aerial fleet, the nature, value, and number of its units, the possibilities and the exact conditions of a raid on London or Paris. Our readers will pardon us for being exclusively technical, and for quoting figures. But there is no serious study without precision—without figures.

"The real offensive value of the German aerial fleet is the sum of the efficiency and number of the units that compose it. Let us, therefore, establish these two points, and commence by defining what a modern Zeppelin is. The imagination has been given free play on this subject, and, as if the Zeppelins were not already monstrous enough, rumour has made them even larger. Some writers have gone so far as to talk of 'super-Zeppelins' of 400 yards in length, which presumes a trifle of 300,000 cubic metres. It can be stated without hesitation that the modern German dirigibles are of the same tonnage as before the war, which is, of course, necessary for their rapid manufacture. Material proofs of this statement, of which the first, sufficient in itself, is the actual dimensions of the German sheds, are obtainable. The longest shed in Germany, that at Leipzig, is 193 metres, and those at the works of Friedrichshafen, which have not yet been enlarged, are 178 metres long. The rotatable shed at Cuxhaven, which cannot be enlarged, is 180 metres. Those at Cologne, Metz, and Baden are only 158 and 160 metres. The French hangar at Maubeuge has lately been enlarged to 160 metres by the Germans. The two 1914 types of Zeppelins measure :—The 22,000 cubic m. army airship, length, 156 m. ; diameter, 14·8 m. ; width over the propellers, 22·5 m. ; and height, 18·8 m. The 27,000 c.m. naval airship, length, 158 m. ; diameter, 16·58 m. ; width over propellers, 22·8 m. ; and height, 19 m. These figures represent, therefore, the maximum size airship which will enter the actual German hangars. It has been possible to improve their economy, but their tonnage, and consequently their radius of action, useful load, maximum attainable height, and speed are the same to-day as they were in July last. This radius of action is sufficient not only in times of peace, but also in war time, as evidenced by the Cuxhaven–Yarmouth–Cuxhaven raid. The length of this was 730 kiloms., or equal to a cruise from Frankfort to Paris and back, or Cologne to London and back. Airships of the same type and carrying the same load can, therefore —theoretically, and speaking from the aeronautical point of view— repeat the performance, starting out from a sufficient number of sheds.

"What are these airships? What weight of bombs do they carry? We know that the Germans have naval airships of a known type, and of 27,000 c.m. capacity. Let us first attempt to calculate their load of explosives, as this will serve as a basis for the estimates of modern ones.

"Let us state, first of all, that the lessons of experience (the bombardment of Antwerp, Ostend, Ghent, of the Belgian campaign, of Warsaw, Plosk, Nancy, the English coast, and Libau) have up to now been very reassuring. In each case there was no real bombardment, and the cruisers of the air, which were the same in numbers as at Yarmouth (two or three) have dropped few bombs, bombs, moreover, which were of light weight and small effect. There were twelve deaths at Antwerp, not a single one at Ostend or at Ghent ; 40 deaths from five bombardments in Poland, 2 at Nancy, 4 in England. This gives a total of about 60 victims, that is to say the crews of two large Zeppelins, all in six months of campaigning, and after fourteen attacks, during which period the flotilla lost at least five units. Nowhere have bombs been found weighing more than 49 kilogs. (this was the weight of the bomb found intact at Yarmouth).

"The estimate of the useful load which a Zeppelin will carry will explain this mystery, which cannot be ascribed to Teutonic modesty.

"The Germans have carefully withheld these figures from us. In the German *Taschenbuch* of the aerial fleets, the useful load of Zeppelins does not appear. We have, however, fairly exact data to go on. The first were furnished at the time of the landing of Z-4 at Luneville in April, 1913. This airship was of the 19,500 cu.m. type (141 m. by 14·8 m.). The total lift was therefore about 20,500 kilogs., but the ship's books showed that the dirigible itself, framework, fabric, motors (three Maybach of 180 h.p. each, and each weighing 448 kilogs.), only left available a lift of 4,800 kilogs., which works out at 23·9 per cent. of the total load.

"From these 4,800 kilogs. must be subtracted 950 kilogs. for the crew (twelve men), and 135 kilogs. of petrol and oil per hour, which makes, for a six hours' cruise (360 kilometres), 810 kilogs. Finally, in order to reach a height of 1,900 m., hardly a sufficient altitude, Z-4 had to jettison 3,000 kilogs. of ballast. The Z-4, therefore, had exhausted its whole useful lift in a six hours' cruise and covering a distance shorter than that from the nearest German shed to Paris or London and back, without counting projectiles, ammunition, armament, and *personnel*. It can therefore be stated that, except by flying very low, and thus running the risk of being brought down, the Zeppelins of the 19,500 cu.m. capacity or less, are unable by far to solve the problem.

"It is for this reason that Germany in 1913 constructed types of 22,000 cubic metres capacity, 156 metres long by 14·8 metres diameter, that is to say, of the same diameter as the older ones, but with two more ballonets (18 ballonets instead of 16). The power and weight of the motors is the same, as is also, for all practical purposes, the speed. Nevertheless, the weight of the gas chamber has been increased by two ballonets, and the following estimate can be made : The weight of the gas-chamber and of the keel has been increased by about an eighth, a weight which has to be subtracted from the extra lift of 2,600 kilogs. furnished by the increase in cubic capacity. Further the extra weight of fuel for four hours which is required in order to give the dirigible the necessary range of action for the raid in question (ten hours' cruise of 600 kilometres) has to be subtracted. This is an addition of 540 kilograms which brings the total weight of fuel up to 1,350 kilos. A crew of twelve men is insufficient, especially in view of the fact that the dirigible is to be fitted with machine guns and gunners. The 27,000 cubic metre type had 28 men on board (the number of victims in the catastrophes that overtook L-1 and L-2). If, in this case, we only take 18 men, that would be an extra load for the crew of 500 kilogs. Then we must subtract the weight of the machine guns, of their ammunition, of two searchlights, and of the sheet steel armouring for the motors, which is 2 millemetres thick and weighs 14 kilogs. per square metre.

"We therefore see that the 22,000 cubic metre type with full war equipment and bound for Paris or London cannot carry anything like a ton of explosives.

"There now remains the 27,000 cubic metre type, which has theoretically 6,000 kilogs. more lifting capacity. But it has a diameter of 16·58 metres instead of 14·18 metres, and is 158 metres long instead of 156 metres. It has four motors of 180 h.p. each instead of three, and a crew of 28 to 30. The first Zeppelin captured at Warsaw had 30 men on board. The expenditure in fuel increases by a tenth. The figures given by the Maybach Works, which are, however, a minimum, give 229 grammes of petrol per horse-power hour and 2·5 kilogs. of oil per hour for each motor.

"The raid on the English coast represented, out and back, a distance of 732 kilometres and a cruise of more than twelve hours' duration, since the L-3, the record breaker, with a maximum speed of 70 kilometres per hour, has never been able to do more than an average speed of 60 kilometres per hour, which will give, including the reserve of fuel necessary in case of wind, 14 hours' fuel, or 2,268 kilos. of petrol and 140 kilos. of oil—a minimum of 2,308 kilogs.

"Let us now work out these supplementary loads ; 500 kilogs. for the fourth motor. In the L-2 there was one more boat. In the L-3 the second rear *nacelle* has been enlarged and the central cabin and the keel retained ; say another 500 kilogs. Increase in gas chamber $\frac{1}{2}$nds, meaning at least 3,000 kilogs. ; increase in ballast take 500 kilogs. (The L-3 had to leave eleven men of the ordinary crew on the ground in order to be able to increase the attainable height from 420 metres to 3,125 metres, the Zeppelin record, established on May 16th, 1914. This gives an extra height of 2,700 m. climbed in 3 hours 30 mins. at the expenditure of a special discharge of 1,000 kilogs., including the weight of the eleven men of the crew.)

"Weight of supplementary crew, 600 to 800 kilogs. Total, 6,100 kilogs., which, even by reducing the ballast and crew, gives us the same weight of explosives, 1,000 kilogs. at the most, transported it is true, a longer distance, 730 kiloms. instead of 540 kiloms.

"The large naval dirigibles which appeared over the English coast certainly had not 1,000 kilogs. of explosives on board, which is proved by the fact that they did not throw that weight. I do not suppose that they would have carried their bombs back to Cuxhaven. These weighed at the most 50 kilogs., and each carried at the outside 20 bombs. Other figures confirm this estimate. Six bombs were

thrown at Antwerp, three at Ostend, five at Ghent, fourteen at Nancy (these airships were of the 19,500 and 22,000 cubic metre type) and let us suppose that there were 30 bombs to two dirigibles over England, and 18 at Warsaw (these must have been naval airships, as the Russians captured 30 men on board). For a raid on Paris or London, the mean distance of which is shorter, this figure of 1,000 kilogs. of explosives would therefore serve as a good basis.

"Let us add that the maximum speed of the Zeppelins is about 72 kilometres per hour. The best performanse is that of the Z-VI (19,500 cu. m., 540 h.p.), Brunswick–Leipzig–Brunswick, 320 kilometres in 4 h. 40 m., which gives 68 kilometres per hour. (16th May. 1914) The greater ones are much slower.

"There now remains to work out the number of the units which we have dealt with.

"There were before the war thirteen Zeppelins, of which one was almost destroyed—the Z-II, brought down at Thionville; the other nearing completion, the Z-IX. They were, in the order of construction: Z-II (17,800 cu.m.), Viktoria-Luise (18,700 cu.m.), Z-III (17,500 cu.m.), Hansa (18,700 cu.m.), Z-IV, which came down at Luneville (19,500 cu.m.), Sachsen (19,500 cu.m.), Z-I (Ersatz II) (19,500 cu.m.), Z-V (19,500 cu.m.), Z-VI (19,500 cu.m.), Z-VII (22,000 cu.m.), Z-VIII (22,000 cu.m.), L-3 (27,000 cu.m.), and Z-IX (22,000 cu.m.). The Hansa and Viktoria-Luise were all passenger-carrying airships belonging to the Delag Company, and the Sachsen, their sister ship, had gone over to the navy in May, 1914. L-3 belonged to the navy, the others to the army.

"We can here add the Schütte-Lanz, called SL-2, of 22,000 cu.m. capacity, which had equalled the Zeppelins at the trials. We need not count two dirigibles, M-4 and M-1, and three non-rigid Parsevals, P-4, P-3, P-2. The largest M is 13,000 cu.m. and the biggest Parseval 10,000 cu.m., so that they simply do not exist as regards the cruisers we have in view.

"This gives us therefore fourteen units at the declaration of war, of which two (Z-II and Z-III) were quite out of date; two others (the Viktoria and the Hansa) were equally unsuitable for the cruise we have in view, and besides very much the worse for wear. Five were of a type that was not suitable for so long a trip, but they may serve for bombarding frontier towns (these are Z-IV, Sachsen, Z-I, Z-V, and Z-VI), and finally four dirigibles of 22,000 cu.m. capacity (Z-VII, Z-VIII, Z-IX and Schütte-Lanz 2), and one of 27,000 cu.m. (L-3). These figures explain the material impossibility of every attack in August.

"I can hardly believe that Count Zeppelin, a personal friend of the Kaiser, German-aeronautical-demi-god, will admit the rival Schütte-Lanz to his squadron. The S-L-2 was already exiled at Liegnitz in Silesia, where it went from Leipzig on May 12th. We can, therefore, without hesitation, eliminate from our calculations the S-L-2 and its sister ship the S-L-3 of 30,000 cu. m. capacity which was in course of construction at Mannheim in August, and there have been no more of them.

"Since then, it is known from an infinity of sources, *and on this subject there can be no possible doubt*, the Zeppelin works have built a Zeppelin every three weeks. Those who are astonished at this figure should remember that in 1913 eight Zeppelins were constructed (Nos. 15 to 22), which works out at one every six weeks, and that in May, 1914, there were opened at Potsdam works intended to double the output of those at Friedrichshafen.

"The Zeppelin works have therefore actually constructed eight or nine dirigibles of new type since the outbreak of war. This makes a grand total of 22 units, of which 13 have a capacity of from 22,000 to 27,000 cu.m., the other nine remaining as above.

"How many of them have been destroyed, and of what capacity were those destroyed? It is possible to ascertain the *certain* destruction of five Zeppelins: two in Russia (Warsaw and Libau), one at Dusseldorf, one at Badonvillers, one at Friedrichshafen. It is *possible* that five others have also been destroyed: one at Metz, one at Cuxhaven, a second one at Friedrichshafen, and two seen by our aviators stranded in the Ardennes in the month of August. There are besides *probable* accidents in the interior of Germany. For the rest we have no certainty.

"There remain then at the most seventeen Zeppelins, at least ten, and probably twelve to fifteen, and it is not possible to ascertain how many of these can be counted as modern types of 22,000 and 27,000 cu.m, capacity, and 156 to 158 metres in length.

"It is possible to state the certain destruction of two of the thirteen indicated above, that at Badonvillers (Z-VIII) and the one in course of construction at Friedrichshafen. The crew of 30 of the first unit destroyed by the Russians indicates a third one as almost certain. There remain then at the most, eleven Zeppelins capable of undertaking the expedition in question, and at least six, say generally speaking eight or nine. We find then that there are in existence and suitable for the raid which formed the object of this study, six to eleven dirigibles of from 22,000 to 27,000 cu.m. capacity and of 156 to 158 m. length, 14·60 m. and 16·58 m. diameter, with four screws grouped in two pairs on two *nacelles* in the axis of the keel and with central cabin. They have a mean speed of 60 kilos. per hour, and a maximum speed of 72 kilos. per hour, and can travel with a load of 600 to 1,000 kilogs. of explosives at a height of from 1,500 to 2,000 m. according to the weather. Here we have, then, all the figures of the great adventure.

"There is nothing very dreadful in it, especially if we consider the material impossibility of grouping them from the start for a collective raid, the absolute impossibility for them of arriving together when starting from different points, and the no less absolute impossibility of successive attacks, once the adversary has been warned by the first dropping of bombs."

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AIRCRAFT AND THE WAR.

According to a message received in Amsterdam, a hostile aviator passed over Cologne on February 3rd. He was fired at, but not hit, and disappeared in the direction of Dusseldorf.

Information to hand from Petrograd reports that an Austrian aviator was recently captured by the Russians in a peculiar way. Catching sight of a body of Austrians about 2,000 strong, marching along, he alighted and was surprised to find, when too late, that they were prisoners.

Writing to the *Daily Express* from the Belgian frontier on February 4th, Mr. Percival Phillips said:—

"Late messages to-night state that an Allies' aeroplane dropped bombs over the German depôt at Knocke at one o'clock this morning. The garrison at Knocke consists of the 4th Marine Artillery Regiment. Four Allies' aeroplanes also made a daringly successful raid northward this afternoon over the portion of the Belgian coast in German occupation. Heavy shrapnel firing by the German anti-aircraft guns met them. One airman was injured, and the others disappeared in an easterly direction at five o'clock.

"Information from another source states that the Allies' aeroplanes were seen above —— Harbour last night, and dropped a number of bombs on the depôts and docks. Several loud explosions were heard during the night at Sluis, Oostburg, and other Dutch frontier towns. The principal gun-fire appears to have been from the German anti-aicraft batteries and the larger artillery mounted at Duinbergen. The entire garrisons of Zeebrugge and Heyst, as well as other troops quartered in the region of the coast, were under arms all night, fearing an extensive attack by land and sea. The Germans sent up a number of coloured lights, apparently warning signals, at various depôts, also star shells illuminating the sky to assist their surveillance against aerial attacks."

A *Daily Chronicle* correspondent, in a description, dated February 5th, of life at the present time in Hazebrouck, said:—

"The sound of an explosion makes us all rush out. What is that—Taubes? Yes, it was a Taube, so now we are in for a real holiday. There are in fact three machines, but so high up that one can hardly distinguish them. Again a bomb falls, and another. We count the explosions and laugh. They seem near the station. Yes, the last one certainly fell near the station.

"But they seem to be widening their circles as they soar round. No, they are not coming round again at all. They are heading off north-east. Over our heads come two English airmen in full cry after them. The English, with marvellous promptitude, are after them.

"We go down to the station to find out the number of the victims. There are none—no dead, no wounded. A few houses have been hit and damaged, that is all. The station is intact. The expedition has failed in its object for this time. . . . .

"The precautions taken by the Dunkirk authorities against the raids of German aeroplanes have had the expected result. The Allies having brought down four German aeroplanes in eight days, the enemy has become more prudent."

News was received in Amsterdam from Northern Holland on Friday that two Zeppelins had been seen over Emden, and that they had subsequently left in a north-easterly direction, evidently taking care to avoid passing over Dutch territory. It is believed that they

were making speed trials, although it is possible they went out over the North Sea.

According to the Sluis correspondent of the *Telegraaf.* in spite of the high wind on Friday night, airmen left Dunkirk and flew over the German positions along the coast. They dropped two bombs in the vicinity of Zeebrugge and Heyst, which exploded without, however, doing any damage.

An *Evening News* correspondent, wiring from Rotterdam on February 4th, reported :—

"I learn that Count Zeppelin has had a long interview with the Kaiser, and that a more energetic airship campaign has been decided on, particularly against the British fleet and transports. A Hamburg café largely frequented by airship officers contains a large glass model Zeppelin and airship relics.

"I am informed by a Dutch traveller that no air pilots have attended the café for two days, and that a big airship raid is contemplated."

In a message from Rotterdam on the following day, a *Daily Telegraph* correspondent said :—

"The activity of yesterday in Western Flanders was continued this morning. The Allies' aeroplanes are constantly hovering over the zone where fighting is going on.

"A message from Bergen-op-Zoom states that an English aeroplane flew over Antwerp this morning. It was fired at, but not hit, and returned in the direction of the English lines."

Writing from the same place on Saturday, a *Weekly Dispatch* correspondent reported :—

"British and Belgian warplanes are flying day and night above Zeebrugge, defying the German guns on the pier, dodging showers of shrapnel, and seeking an opportunity to drop bombs on the submarines lying in the inner harbour.

"A Flanders correspondent in whom I place great reliance sent me details of a daring British air attack, resulting in the sinking of a submarine. The warplanes follow a fixed routine, appearing at the same hours, and this permanent danger from the air is demoralising the German garrison. On Thursday night an English warplane hovered over Zeebrugge, and, defying the concentrated fire, made a sudden dive 300 ft. from the ground. About forty Germans returning from a disciplinary court, where they had been sentenced to punishment, ran for cover in all directions. The airman coolly dropped bombs at short range on a submarine moored in the Mole. There was a terrific explosion, and the submarine was sunk. The airman got safely away.

"Sailors of the Fourth Marine Division, 1st Regiment, told me they preferred to be on the Yser rather than on the coast, where the English will soon take them prisoners. They declared that they had a great fear of the Allied warplanes, for, despite searchlights and special anti-aircraft guns, they have not succeeded in bringing down a single warplane."

In the *communique* issued in Vienna on Sunday, it was stated :—

"In the Adriatic an air attack by our aviators on French transports was successful, bombs being dropped."

A *Daily Mail* correspondent, writing from Rotterdam on Sunday, said :—

"The battle on the coast continues, the aeroplanes of both sides being very active.

"Zeebrugge was guarded yesterday by German aeroplanes, which circled over the harbour. Should the Allies accept the challenge a terrible air battle may occur.

"Most effective work is being done by the Allies' airmen."

The following message, dated February 7th, was received by the *Matin* from Rheims :—

"On Friday Taubes attempted to fly over the city. Our guns immediately prevented their progress, and they returned with all speed to their own lines."

The following account of the shooting down of three German machines was sent by the *Times* correspondent in Paris on Monday :—

"The activity of aircraft on both sides has been one of the features of the war in the western theatre during recent days. Continual proof is afforded of the superiority of the Allies in this direction. Three German aeroplanes have been brought down during the past week, one near Dunkirk, another near Gebweiler by salvoes from infantry. In the latter case a machine gun was captured intact. The third fell a victim to British airmen near Lille, where it was brought down with a machine-gun."

A *Daily Mail* correspondent, in a message from Verey, dated February 2nd, only published last Monday, said :—

"Yesterday ten French aeroplanes were seen reconnoitring over Alsace. A German captive balloon was destroyed by means of bombs and darts, its two occupants being badly injured."

The following description of how a German aeroplane was brought down by a British pilot was sent by the Hazebrouck correspondent of the *Matin* on Monday :—

"On Friday last two Germans in a Taube appeared going towards Bethune. They dropped a quantity of proclamations, and the guns were fired at them, but without effect. The Germans then tried to escape in the direction of Lille, but were pursued by a British machine with a quick firing gun on board. The German observer was killed, and the aeroplane, badly damaged, fell into the German lines. The British aviator returned unhurt."

The following message was sent by the *Daily Mail* correspondent in Northern France, on Monday :—

"Despite frequent bombardments the inhabitants of Armentières remain in the town, taking refuge in their cellars as soon as the first shell warns them that the bombardment is beginning. On Friday, a number of German aeroplanes raided the district. At Bailleul, near Hazebrouck, two bombs fell near a group of soldiers.

"At Hondeghem and at Wallon Cappel an Aviatik dropped some bombs, but without causing any serious damage. The aeroplane then headed for Mont Cassel, where it was greeted by a violent cannonade."

According to information received in Paris on Tuesday, a German aeroplane had flown over Pont-à-Mousson, dropping darts.

Mr. H. Devitte, writing to the *Daily Express* from Geneva, on February 9th, said :—

"It is reported at Friedrichshafen that one of the newest Zeppelins, which has been missing for four days, fell into the North Sea off the coast of Denmark during a storm. All the crew were drowned, and the airship was destroyed. The cause of the accident is not known.

"Two Parsevals and one Zeppelin will accompany the German troops which are to take the offensive against Servia. The Parsevals, which were deflated and placed on special trucks, passed through Munich yesterday on their way to Vienna with the German staff.

"Following the violation of Swiss territory by German aeroplanes, fifteen German shells fell yesterday on the Swiss village of Largin, causing material damage. The military authorities have arrived there, and an inquiry has been opened."

An officer on H M.S. "Meteor," in a letter describing some of the incidents in the recent battle in the North Sea, said :—

"We were about 300 yards away, and watched her go down, and I was particularly struck with the ease and slowness with which she sank. Not till the waves had almost entirely closed over her did the bow heave slightly out of the water, and she disappeared stern first. While the boats were rescuing the survivors a Zeppelin and a Taube put in an appearance. The Taube dropped about three bombs, one of which fell amongst the drowing men, and literally blew four of them to pieces. I suppose the idea of our rescuing an enemy was beyond the understanding of the cultured pilot of that machine. But, oh! it must have been a rude awakening to him when he returned to find that it was one of their own ships he saw sinking, and his own countrymen he had killed. . . . . Never before has there been a naval battle to equal it in intensity. A battle which raged for four hours between ships of such enormous size and destructive qualities, steaming at thirty knots the whole time, and with aircraft and submarines taking part, is most certainly without parallel in the history of the world."

Some extraordinary "news" appears to be finding its way into the Turkish newspapers published in Asia Minor. According to the *Daily Mail's* correspondent in Paris, it was recently asserted in the *Hanumlhar Ghazettaseh*, that the 1st Turkish Army Corps has been transported from Constantinople by 25 German balloons to the scene of the war.

Models

Edited by V. E. JOHNSON, M.A.

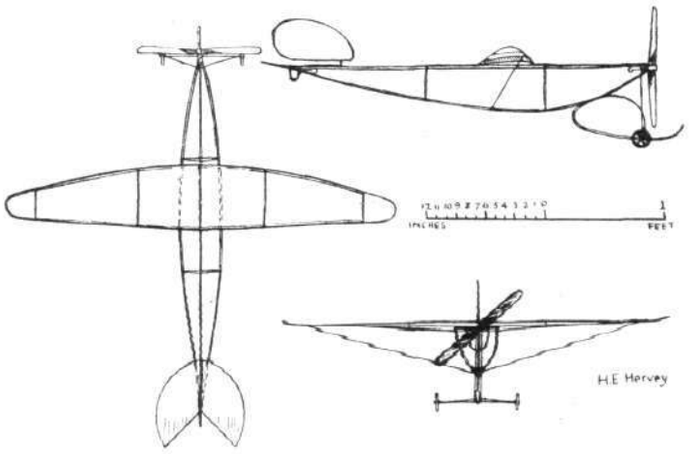
Model Research Work.

IN December 4th, 1914, issue we published a communication from the hon. sec. of the Paddington and District Club stating that several members of the club were about to take up research work in connection with rubber-driven models, and that the hon. sec. would be glad of suggestions along what lines such might be taken up with advantage.

The subject of model aeronautical research work is one which presenta many special difficulties even to those professionally engaged in scientific research work ; still more is this the case when it is taken up in one's spare time, as a hobby or pastime, as it were. Our personal experience of such cases is that the greatest difficulty is in really carrying any particular set of experiments right through to the bitter end.

In the course of the last three years many communications have reached us, relating to some particular series of experiments partly or half done, the communication invariably stating that further experiments would be made in due course and the results sent to us. Not in a single instance, so far as we can remember, has this been done. It is this lack of anything approaching completeness in so many of the series of experiments that have been undertaken that has left model aeronautics in such a chaotic condition ; at present it is an art, not an exact science.

The programme, or rather, perhaps, we should say, the suggestions of the Paddington Club, as stated by Mr. W. E. Evans, are numerous and varied ; the thorough investigation of any one of them probably constitutes a season's work in itself. Certainly a season's



Tractor monoplane by H. E. Hervey.

work could well be devoted to the question of "propellers." If this question was only settled with respect to some particular type of model it would be well worth doing. It should be possible to carry out three sets of experiments simultaneously—one in a wind tunnel, one on models in free flight, and one with a suitable containing frame and recording instruments running on an aerial wire ; two parallel aerial wires not less than 9 ft. apart would be best.

Experiments which have been carried out in model form in wind tunnels, &c., have been already shown in many cases to be applicable to full-sized work, and the results obtained have proved of the greatest value to designers.

In such cases as this we have instances of the *direct* applicability of model research work to full-sized design.

There exists, however, another and totally different kind of model research work, viz., research work having no *direct* relation to full-sized work at all, but carried out solely with a view to improving the model machine as a model machine only, *i.e.*, to increase its flying capabilities, its stability, &c. Such work can undoubtedly be termed research work of an indirect character, and it is quite easy to see that such work might have a very important bearing on direct research work, and thence on full-sized design. It would undoubtedly be a mistake to ignore this point of view or neglect the cultivation and improvement of the model *as a model*, using the term "model" in a very broad sense.

We have at present only four types of motors applicable to model aeronautical research work, viz., rubber, compresed air, steam, petrol. With respect to the first named, it is, we think, generally admitted that something like finality has been reached ; of the other three, the least developed, probably, is compressed air ; to the ordinary aeromodellist it offers certain advantages over the other two, with respect to cheapness and ease, and certainty of working. Quite a large number of aeromodellists are keenly interested in this type, and it is certain of further development. In course of time probably this will in its turn give place to petrol as being "the" thing, more especially will this be the case when the petrol motor has been cheapened, and still further reduced in size. At the present time the petrol-driven machine is too large, apart from the knowledge necessary to obtain the best results from it, for it to come into anything like general vogue.

There is plenty of model research work to be done with respect to c.a. plants, as applicable to model aeronautics, with plenty of "sport" attached to it as well, and for this reason we think it should receive every encouragement. One fact must, however, be carefully guarded against, certain rules will undoubtedly have to be passed (the sooner the better), limiting the size, *i.e.*, the diameter and length of the reservoir, more especially the former, with respect to the span, &c. of the machine. There is no reason that we know, in the case of a tractor, why its lateral dimensions need be larger in proportion than the covered-in *fuselages* of full-sized machines. We have been "blessed" with the "flying-stick" ; do not let us be "cursed" with the flying "sausage," especially under present circumstances.

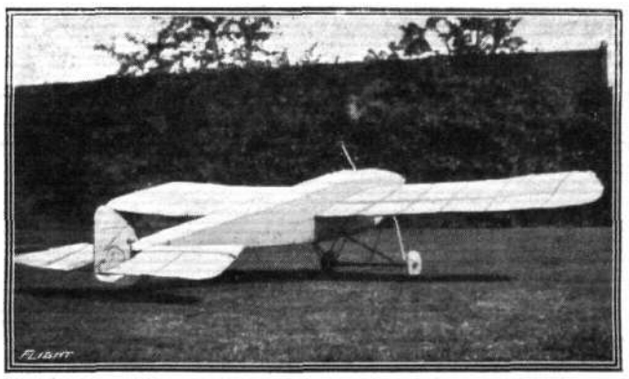
The efforts of the Paddington Club will be watched with the deepest interest, and we wish them every success ; we trust also they will act as a powerful incentive for other clubs to go and do likewise.

Hargrave's Compressed-Air Plant.

A correspondent writes asking if c.a. plants are likely to be so successful in the case of model aeroplanes, why they have not been used before. In this instance, too, as in others, there is no new thing under the sun. Prior even to 1893, *i.e.* more than twenty years ago, Lawrence Hargrave, an Australian and the inventor of the modern box kite, studied the question of compressed-air motors for model flying machines. His motor is described as a marvel of simplicity and lightness, its cylinders made like a common tin can, the cylinder covers constructed from sheet tin pressed into shape, the piston and junk rings of ebonite. One of his containers was $23\frac{3}{8}$ ins. long and $5\frac{1}{2}$ ins. in diameter, made of aluminium sheet $\frac{1}{16}$ in. in thickness ; $\frac{3}{8}$ in. by $\frac{1}{4}$ in. riveting strips were insufficient to make airtight joints. It weighed 26 oz., and at 80-lb. water pressure one of the ends blew out, the fracture occurring at the bend in the flange and not along the line of rivets. The successful receiver was a tinned iron one ; steel tubing could not be obtained at that time in Sydney. With a container of this character and the engine referred to above, a flight of 343 ft. was obtained, this being the best flight. The time of flight was 23 secs.

The propeller was on the ornithopter or wing-flapping principle, and not rotary. The engines made $54\frac{1}{2}$ double vibrations in the above flight.

In Tatin's air-compressed motor (1879) the reservoir weighed 700 grammes and had a capacity of 8 litres. It was tested to with-

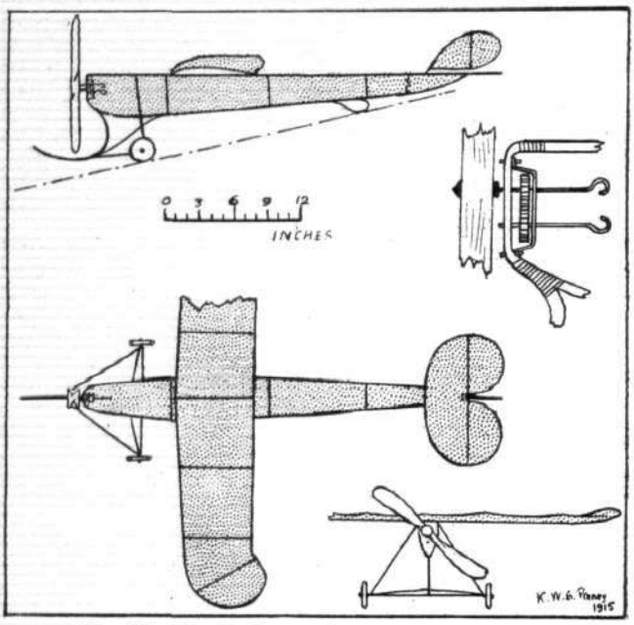


Mr. Ross Gowie's large Morane-Saulnier model.

stand a pressure of 20 atmospheres, but was worked only up to 7. The engine weighed 300 grammes and developed a motive power of 2 kilog.-metres per sec. The model had a surface of 0·7 sq. metres, and weighed 1·75 kilogs., and had a sustentation velocity of 8 metres a sec. It revolved round and round a track, tethered to a post in the centre. In one of its "jumps" it cleared the head of a spectator. It was a tractor twin-propellered, and each propeller had four blades.

Mr. K. W. G. Pinney's Tractor Monoplane.

The main plane has a span 35·2 ins. and a maximum cord of 7·25 ins. Length of covered-in *fuselage*, 35 ins. Area of tail, 10 ins. by 8 ins. The *fuselage* has three longitudinals and three sets of bracing spars, and is covered with Clarke's "Flight" silk.



Mr. K. W. G. Pinney's tractor monoplane.

The propeller is a 12-in. centrale type, driven by two skeins of seven strands $\frac{3}{16}$-in. strip rubber. The gear wheels are two of Bonn's $\frac{1}{10}$-in. The machine is very stable, and climbs at a steep angle. The best flight to date is 31 secs.

Hard and Soft Solder.

(Reply to Query.)

Solder is an alloy of lead and tin; when it has to stand a rather high degree of heat it is termed *hard* solder, a *soft* solder fuses at a lower temperature.

Hard or plumber's coarse solder is composed of two parts of lead and one of tin, its fluxing point is 440° F.; plumber's fine solder has a composition of 1 part lead and 1 part tin, its fluxing point is 370° F.; tinner's solder is composed of 1 part of lead and 1·5 of tin, its fluxing point is 334° F. Very thin sheets of metal can be soldered best by moistening the surfaces with the flux and putting a piece of tinfoil between them, using a hot soldering iron to melt the tinfoil.

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Grahame-White Co., Move.

OWING to the continued expansion of their business the Grahame-White Aviation Co., Ltd., have moved from their old quarters at 166, Piccadilly, to larger and more convenient premises at 32, Regent Street, W. (adjoining Piccadilly Circus). The West End offices of the London Aerodrome, Hendon, N.W., have also, of course, been transferred to the new address. Note should be made of the new telephone number "Regent 4423," but the telegraphic address remains as before, "Claudigram, Piccy, London."

All About "Shell" Spirit.

UNDER the title of "Shell—from the Oil Wells to the Car," the distributors of Shell Motor Spirit have issued an illustrated brochure describing the processes which are passed through by Shell spirit, and the careful methods adopted to ensure that when it reaches the hand of the consumer it shall be absolutely pure and full measure.

Fatal Accident at Shoreham.

IT is with the greatest regret that we have to record the fatal accident to Lieut. W. F. Sharpe, of the first Canadian contingent, Royal Flying Corps, which occurred at Shoreham on Thursday of last week. According to the evidence given at the inquest, Lieut. Sharpe was flying a Maurice Farman biplane at a height of about 1,000 ft., when he made a sharp turn and at the same time attempted to climb. The result was that the machine side-slipped and made a "nose" dive to earth. It was also stated that the accident was apparently due to over-confidence on the part of the pilot. The engines and controls were in perfect order. A verdict of accidental death was returned.

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ENEMY PATENTS RELATING TO AERONAUTICS.

THE following list of British patents which have been granted in favour of residents of Germany, Austria, or Hungary, is furnished in view of the new Patents Acts, which empower the Board of Trade to grant licences under certain conditions to British subjects to manufacture under enemy patents, and is specially compiled for FLIGHT, by Lewis Wm. Goold, Chartered Patent Agent, Enrolled Patent Attorney in the United States, 5, Corporation Street, Birmingham. It is desirable in the first instance to obtain a full copy of the patent specification (price 6*d.* each patent), and also the latest particulars upon the Patents Register. If any patent listed has been assigned to a non-enemy proprietor, the law does not apply.

No. 16890/12. Steering and balancing. In order to bank an aeroplane without producing a difference in the head resistance at the two sides of the machine, the main planes are oppositely turned to decrease the lift of the plane at one side of the machine and increase the lift at the other side, and, at the same time, auxiliary surfaces at the tips of the planes are bent or tilted oppositely to the main planes to neutralise the change in the head resistance of the main planes. Rumpler Luftfahrzeugbau Ges., E., Berlin. Dated July 27th, 1911.

No. 18171/12. Anchoring; starting; stopping way. An anchoring-device adapted to be operated from the pilot's seat, and enabling the machine, at starting, to be detained until the necessary motor speed has been attained, and, at landing, to be more or less abruptly stopped. Keissler, A. von, Germany. Dated December 20th, 1911.

No. 18178/12. Anchoring; starting. Comprises improvements in the anchoring and braking device described in the parent specification. Keissler, A. von, Germany. Addition to 18171/12.

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IMPORTS AND EXPORTS, 1914–1915.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see FLIGHT for January 25th, 1912; for 1912 and 1913, see FLIGHT for January 17th, 1914; and for 1914, see FLIGHT for January 15th, 1915:—

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	1914.	1915.	1914.	1915.	1914.	1915.
	£	£	£	£	£	£
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